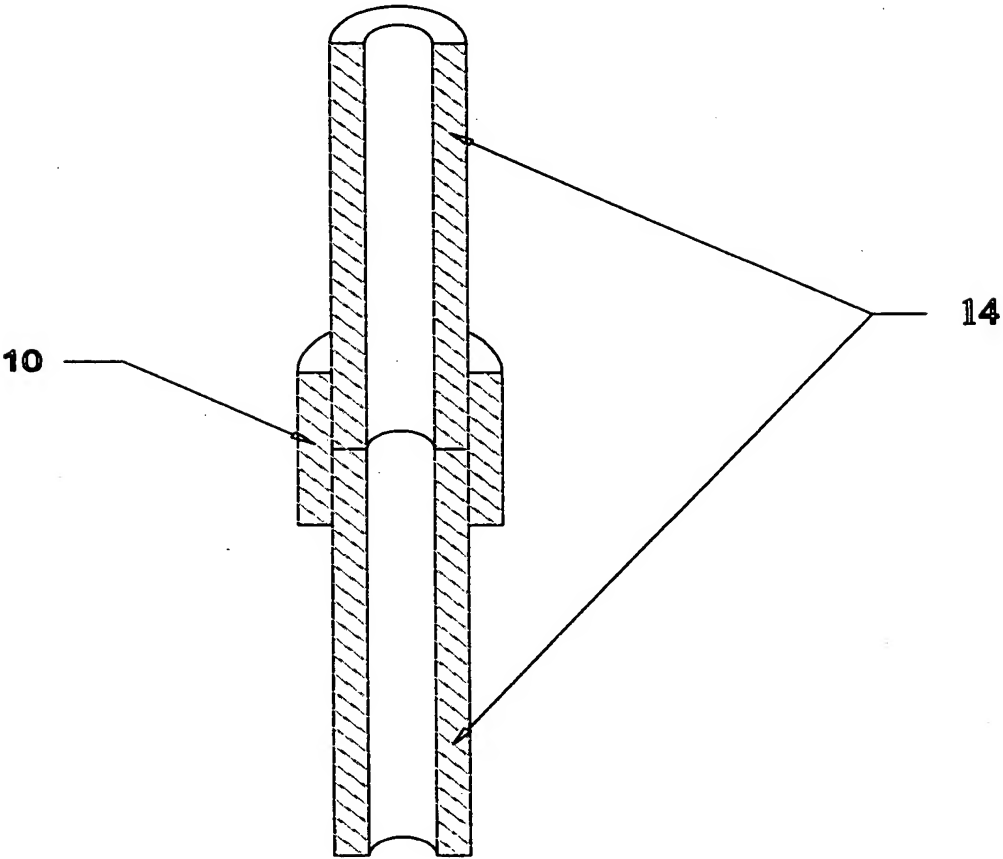


**Assembled 3D Joint**



**FIG. 1**

# Tapered 3D Joint

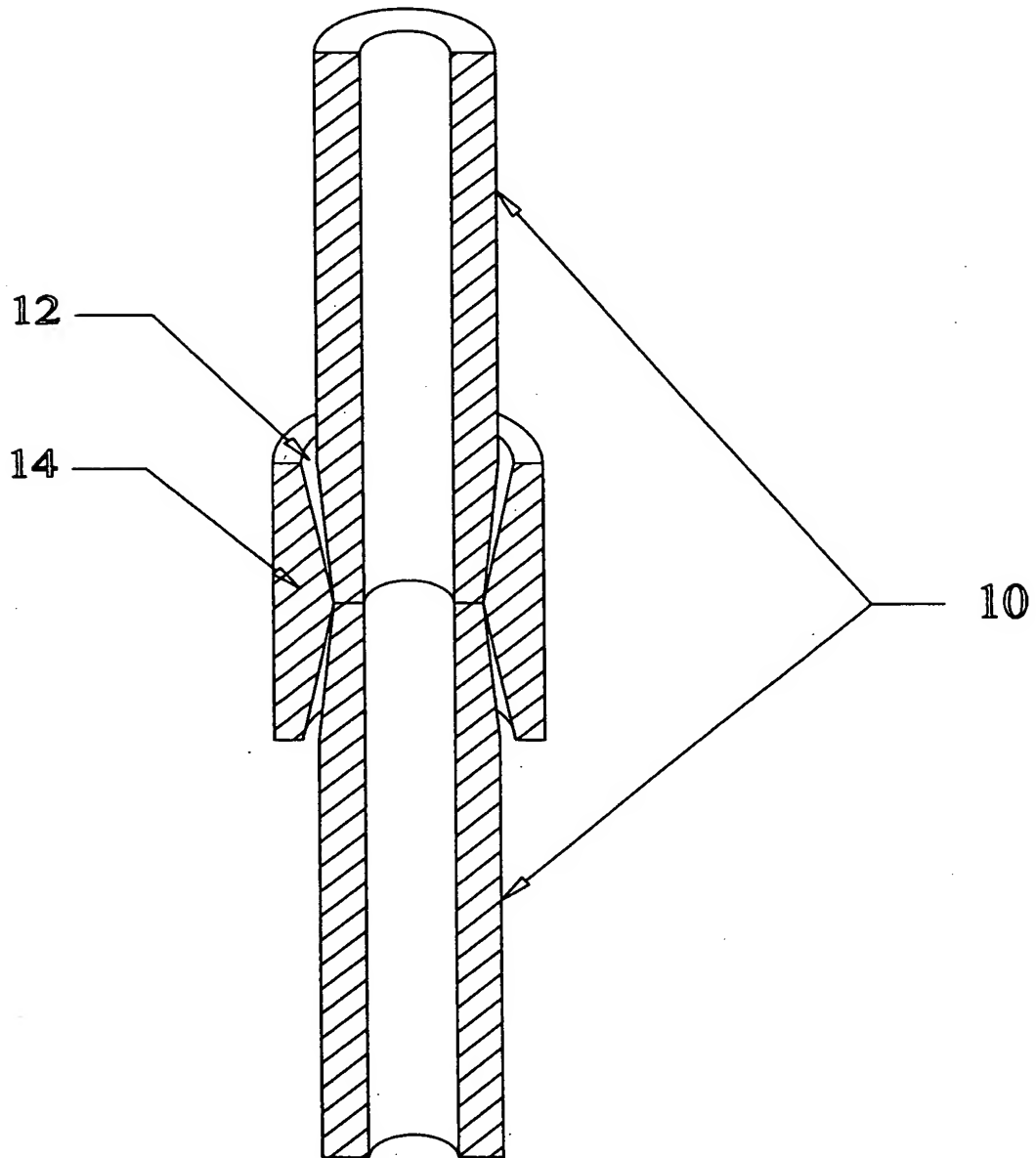


FIG. 2

Large diameter  
to small diameter  
lap joint

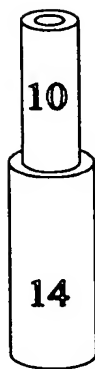


FIG. 3a

Elbow  
bend  
joint

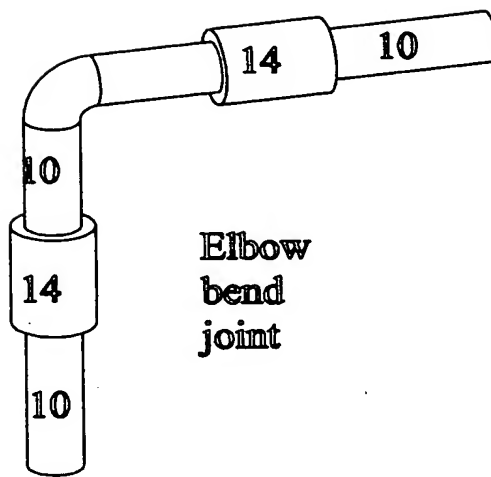


FIG. 3b

U-bend  
joint

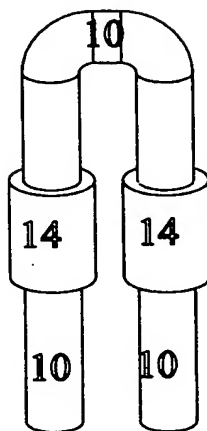


FIG. 3c

Y-bend  
joint

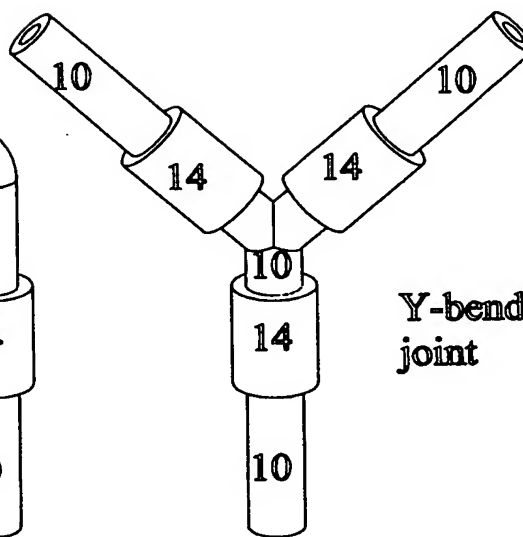


FIG. 3d

Manifold  
Configuration

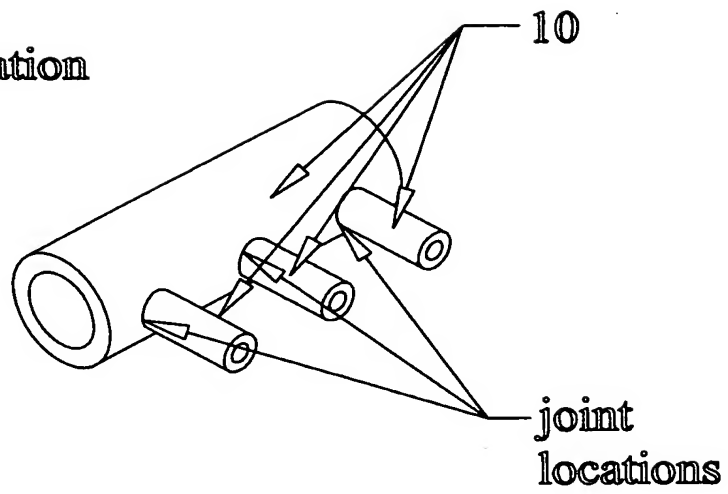


FIG. 4a

Corner  
Edge  
Joint

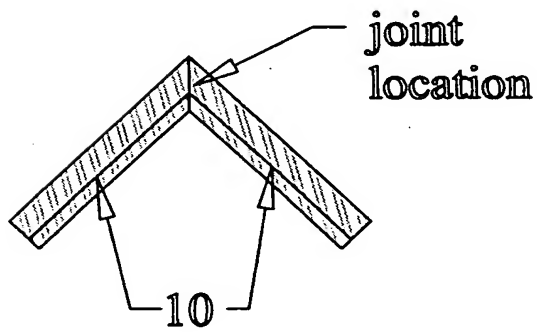


FIG. 4b

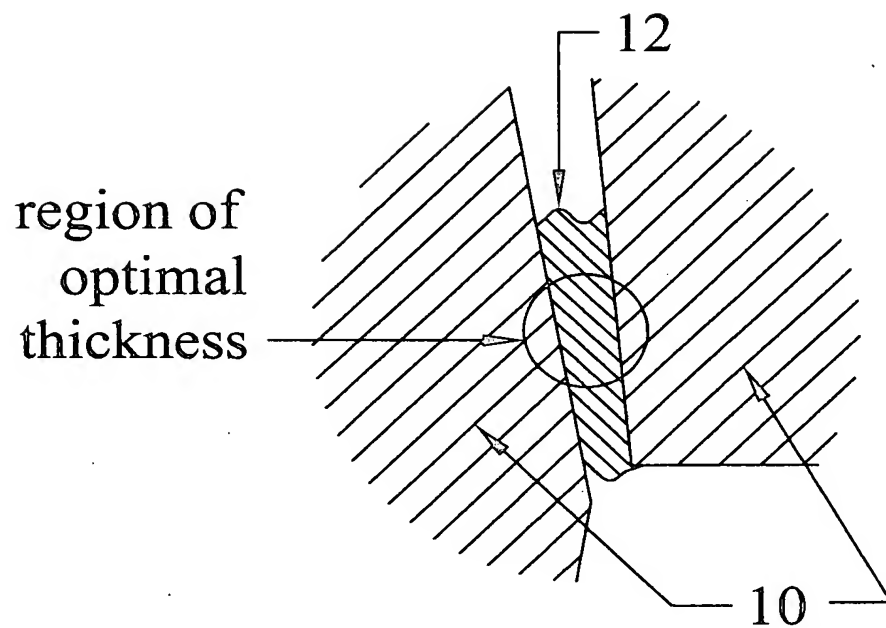


FIG. 5

### 3D Joint Fabrication Process

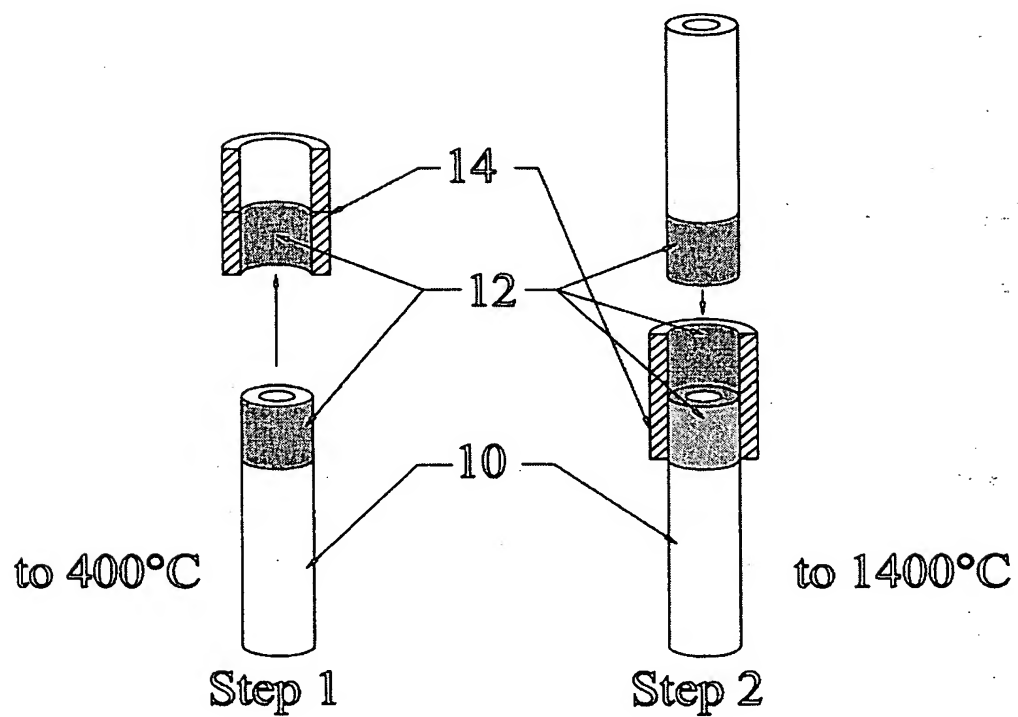


FIG. 6